System Specification

Simulation Rehost, Atlas DP1

Checkout and Launch Control System (CLCS)

84K00303-016

Approval:

Chief, Hardware Design Division	Date	Chief, System Engineering and Integration Division	Date
Chief, Software Design Division	Date	CLCS Project Controls Office	Date
Chief, System Applications Division	Date	Project Manager, CLCS	Date

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Supporting Document Note:

Acronyms and definitions of many common CLCS terms may be found in the following documents: CLCS Acronyms 84K00240 and CLCS Project Glossary 84K00250.

REVISION HISTORY

REV	DESCRIPTION	DATE
Draft 1	First draft of Atlas Simulation Rehost DP1	2/12/98

LIST OF EFFECTIVE PAGES				
Dates of issue of change pages are:				
Page No.	**A or D***	**Issue or Change No.**	**CR No.**	**Effective Date****

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1.

1. INTRO

1.1 SIMULATION REHOST OVERVIEW.

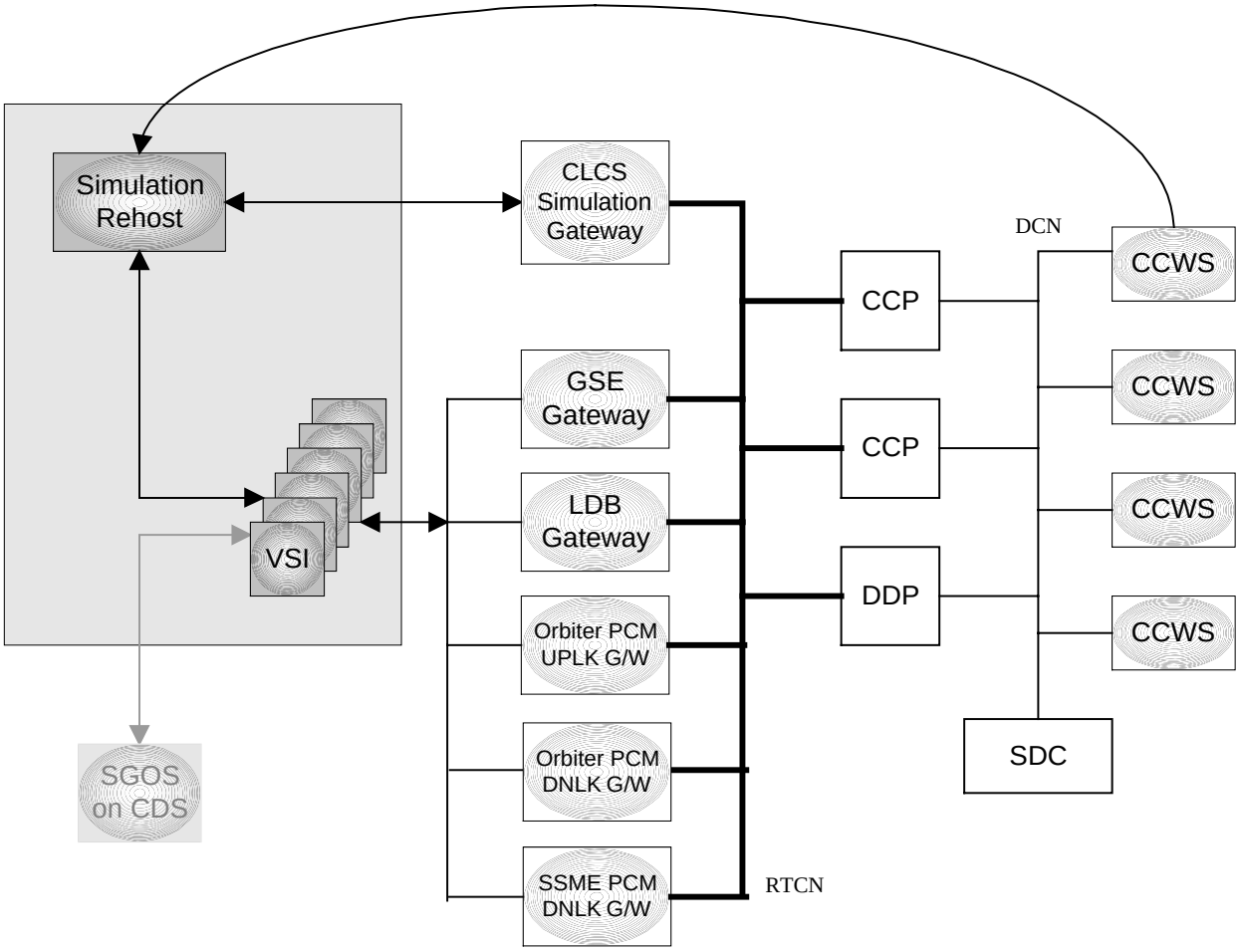
The Simulation Rehost effort is part of the Central Data Subsystem (CDS) rehost of all applications from the Honeywell DPS-90 to a non-proprietary platform. Specifically, the Simulation Rehost is the functional replacement for the current simulation system that is based on the Shuttle Ground Operations Simulator (SGOS). As currently scheduled, Atlas coincides with completion of the Simulation Rehost formal validation period and start of modifications to the operational VSI for transition to the new system.

1.2

SIMULATION REHOST CONCEPT

The Simulation Rehost components to be delivered include the Model and Procedure Translators, Model Databank Processor, Model Build, and a Simulation Engine to support both non-real-time and real-time model execution. In addition to these tools providing a functional replacement for the current simulation system, there will be to provide non-CCMS graphics support (i.e., SL-GMS displays) delivered with the Simulation Rehost.

Simulation Rehost will provide support to CLCS via the VSI connected to the GSE, PCM, and LDB Gateways. Support to the Simulation Gateway will also be provided by Simulation Rehost.

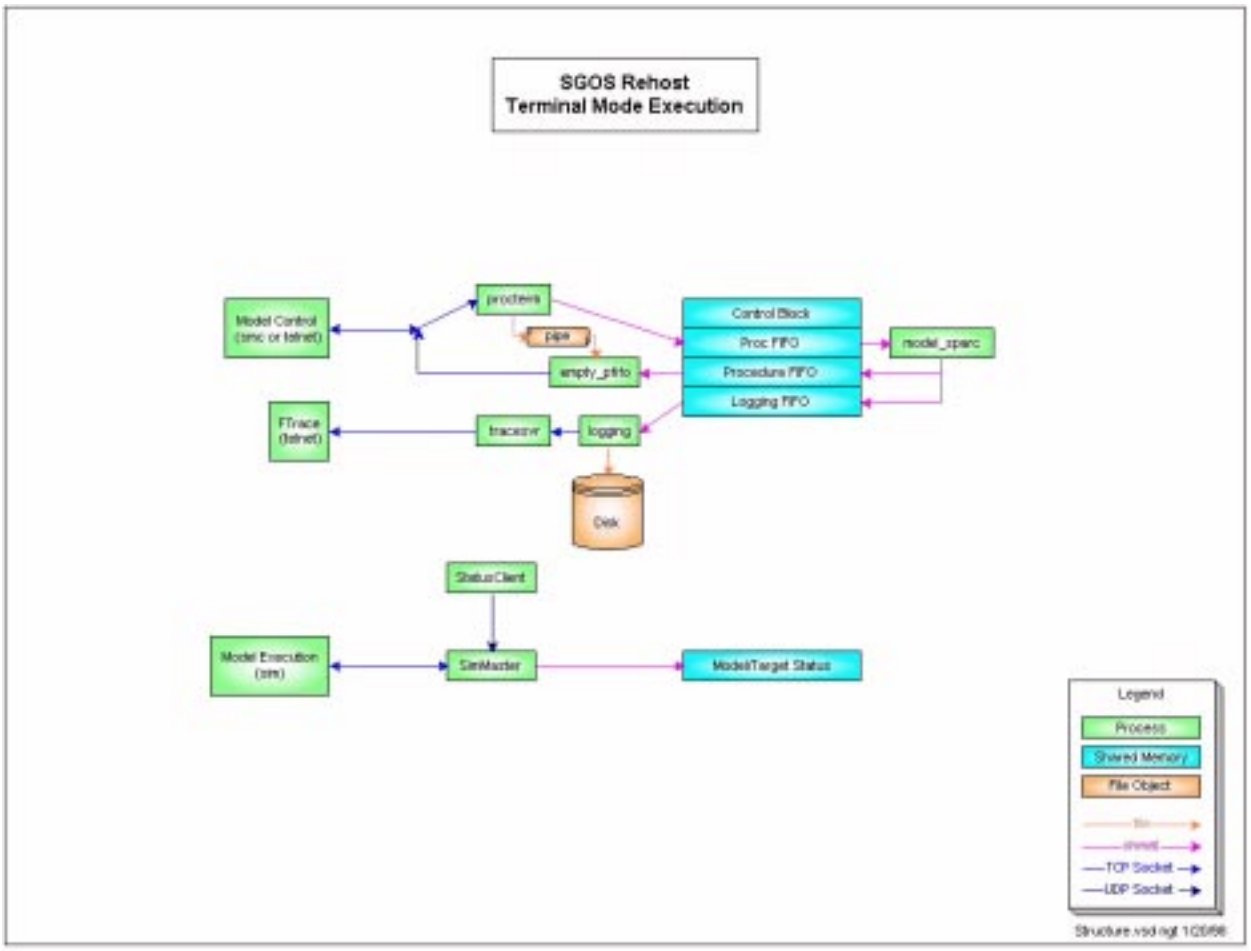


1.3

OPERATIONAL AND FUNCTIONAL OVERVIEW

Simulation Rehost provides model execution in both real-time and non-real-time (i.e., terminal mode). Simulation Support in the non-real-time mode of operation provides for the development and debug of Simulation Software (i.e., Math Models).

Remote Terminal Model Execution will be done on the Simulation Server. The math model, simulation engine, and supporting processes execute on the Simulation Server. Model execution and display will be controlled remotely from an interface on the executing on the user's workstation. Data Logging is done back to the user's workstation.

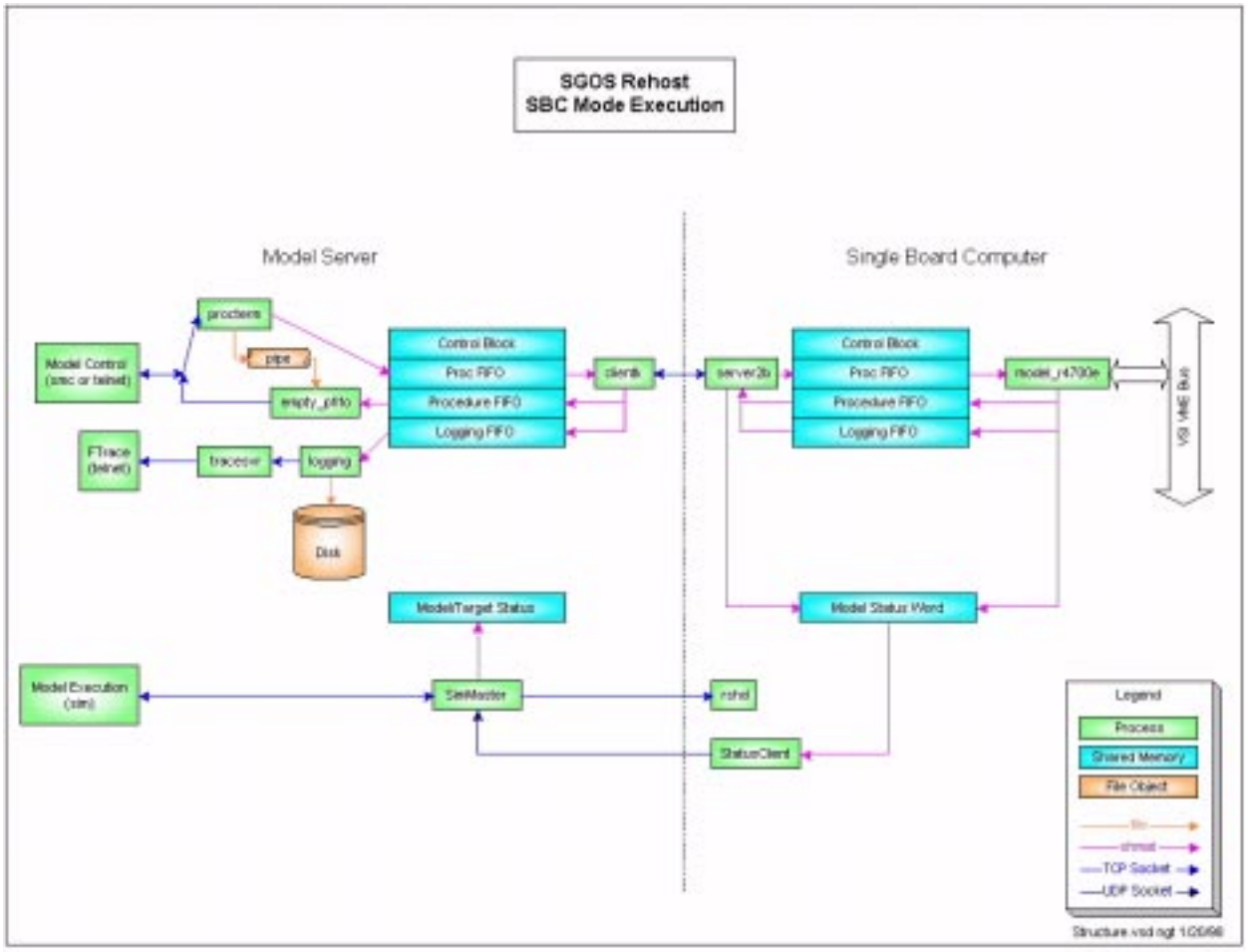


The Simulation Rehost real-time mode of operation will be utilized by both hardware and application software engineers to provide the following functions:

- Testing and validation of CLCS User Application Software
- Checkout and validation of test procedures (i.e., both manual and automated
- Launch team, multi-user, and single user training

Additionally, the real-time mode of Simulation Rehost will be used by system software and hardware engineers to perform CLCS equipment check-out.

Real-time Model Execution will be done on a Single Board Computer (SBC) in the Video Simulation Interface (VSI). There will be one SBC for each of the production VSI. The math model, simulation engine, and data communication processes execute on the SBC. Corresponding data communication processes execute on the Simulation Server to send and receive model data to and from the Simulation Engine on the SBC. The data communication and additional supporting processes on the Simulation Server facilitate communication with the model control interface and provide for simulation system process management. Model execution and display will be controlled remotely from an interface on the user workstation.



1.4

SIMULATION REHOST SPECIFICATION

As identified in the Atlas Delivery Document, this delivery is to provide initial uses of the Simulation Rehost.

1.4.1 Statement of Work

- Provide support of HMF SGOS Model for Desktop Debug.
- Provide support of HMF SGOS Model by way of VSI.
- Provide initial support for SGOS model validation.

1.4.2 Requirements

(SLS 2.5.1.1) The Simulation System shall support the edit, compilation, and build of math models and associated model control procedures (MCPs).

(SLS 2.5.1.2) The Simulation System shall support, the execution, testing, and checkout of models and MCPs.

(SLS 2.5.1.3) The Simulation System shall support execution and interfacing models to the CLCS in the real-time mode of operation to provide:

- Testing and validation of CLCS User Application Software
- Checkout and validation of test procedures (i.e., both manual and automated
- Launch team, multi-user, and single user training
- CLCS equipment check-out

(SLS 2.5.1.4) The Simulation System shall support execution and interfacing models to the CLCS in the non-real-time mode of operation to provide:

- Development and debug of CLCS User Application Software
- Development and debug of test procedures (i.e., both manual and automated)
- Development and debug of CLCS System Application Software
- User training

(SLS 2.5.2.1) The Simulation System shall provide data link compatible real-time simulation capability to CLCS Gateway for all KSC RTPS Sets and KATS.

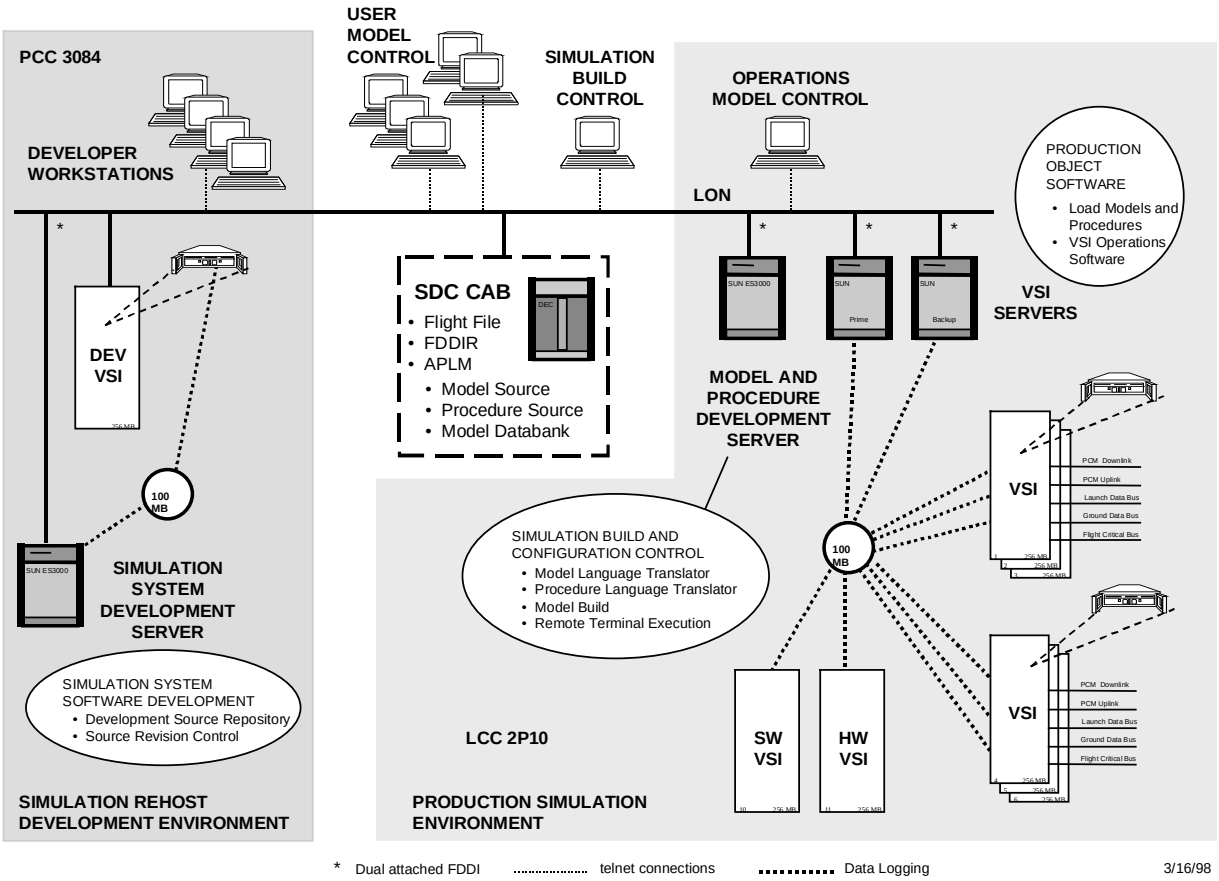
(SLS 2.5.2.2) The Simulation System shall provide Gateway RTCN compatible real-time simulation capability interfacing with DDP and CCP Subsystems directly via a Simulation Gateway without the use of other front end Gateways for all KSC RTPS Sets.

(SLS 2.5.2.3) The Simulation System shall provide network access to external non-real-time simulation capability to office area Desktop Debug ~~Application Test-bed~~ Environments.

(SLS 2.5.2.4) The Simulation System shall provide internal non-real-time simulation capability within office area Desktop Debug ~~Application Test-bed~~ Environments.

1.5

SIMULATION REHOST HARDWARE DIAGRAM



1.6

SIMULATION REHOST DELIVERABLES

Software:

Deliverable	R&D Document	Code	API Manual	Users Guide
Model Translator	✓	✓		On-line/TBD
Procedure Translator	✓	✓		On-line/TBD
Model Databank	✓	✓		On-line/TBD
Model Build	✓	✓		On-line/TBD
Simulation Engine	*	✓		
Simulation Master		✓		On-line/TBD
SL-GMS Display API		✓	TBD	On-line/TBD
DDE Support		✓	TBD	On-line/TBD
SMC	✓	✓		On-line/TBD

* Simulation Engine requirements have been obtained through the existing SGOS Requirements and CDS Interface documentation and source code for the current simulation engine.

Hardware:

Deliverable	R&D Document	Drawings	Prototype	Users Guide
Simulation Server (COTS)				
Single Board Computers (COTS)				
VSI				

1.7

SIMULATION REHOST ASSESSMENT SUMMARY

This section contains the summary of the remaining hardware costs and procurement activities to be completed to implement Simulation Rehost.

1.7.1 Labor Assessments

Not Applicable.

1.7.2 Hardware Costs

The following table summarizes the major hardware components required to provide the operational deployment for the Simulation Rehost. These hardware costs are budgeted for in the Simulation Rehost part of the CLCS budget.

Item number	Name	Unit Cost	Qty.	Total	Assumptions
1	Sun ES3000 Server	$47,000	3	$141,000	
2	Single Board Computer	$18,000	10	$180,000	
3	Facility Mods to 2P10			$0	Level of Effort
4	Install Servers in 2P10			$0	Level of Effort
5	Install SBCs in VSI			$0	Level of Effort
		Total:		**$321,000**	

1.7.3 Simulation Rehost Procurement

The following procurement activities must be completed for deployment of the Simulation Rehost:

Procurement Activity	Completion Date
Procure (last) Simulaton Server	2/28/98
Define SBC Requirements	3/15/98
Submit Purchase Request to Procurement	3/30/98
Award Contract	6/30/98
Receive Single Board Computers	8/30/98

1.8

SIMULATION REHOST SCHEDULE & DEPENDENCIES

1.8.1 Schedule

The following tables identifies the major activities and milestones that remain to be completed for the Simulation Rehost effort:

Task Name	Start	Finish
Simulation Rehost Concept Panel Internal Review		2/16/98
Simulation Rehost Concept Panel		2/18/98
Simulation Rehost R7		3/9/98
Software Release to Validation		5/6/98
APLM and Master Model Builds	5/6/98	6/3/98
Validation (CITE, S0044, S0056, S0066, KATS, GLS)	6/4/98	9/11/98
Final Validation (CITE, Master Models, S0044, S0056, S0066)	9/14/98	10/30/98
Update APLM and Master Model Builds for Support	9/26/98	10/30/98
Software Release to Production		10/30/98
Simulation Operational Readiness Review	11/2/98	12/8/98
Perform Modifications to Operational VSI (1-6)	12/10/98	1/27/99
Simulation Operational Support Available (starting with VSI 1)		12/15/98
Perform Modifications to Operational VSI (10, 11, ILMF)	1/29/99	2/17/99

1.8.2 Dependencies

No.	Dependency Area	Dependency	Need Date
1	SDC CAB	Require SDC CAB to produce a Flight TCID with Function Designator Directory (FDDIR) and Flight File (FF) products available for Model Build	5/6/98

1.9

SIMULATION REHOST SIMULATION REQUIREMENTS

Not Applicable.

1.10 SIMULATION REHOST INTEGRATION AND SYSTEM TEST PLAN

Testing of Simulation Rehost software releases R2 through R7 is being performed by USA Math Models and USA SGOS Sustaining Engineering. The testing efforts are directed and documented by the Simulation Rehost Test Plan developed by USA Math Models. The Simulation Rehost Test Plan will also document the testing to occur in the formal Simulation Rehost Validation period. No CLCS software or hardware resources are required for the Simulation Rehost Validation.

1.11 SIMULATION REHOST TRAINING REQUIREMENTS

This section contains a list of Required Training associated with Simulation Rehost.

1.11.1 Training Needed

None.

1.11.2 Training to be Provided

Instructions for the use of the Simulation Rehost products are currently available online and can be accessed off the Simulation Rehost home page available off the WBS 2.0 SIM link on the CLCS home page. There are no SGOS language training requirements for the SGOS Model Developers or SGOS Sustaining Engineers as the SGOS syntax is not changing. Instruction for the use of Model Build is available online as well as instruction for starting the Simulation System in order to provide math model execution and required simulation support. No training in the use of the Simulation System is planned at this time.

1.12 SIMULATION REHOST FACILITIES REQUIREMENTS

The remaining facility modification to LCC 2P10 for installation of the Simulation Servers is the installation of the rack for mounting the servers. Under floor power for the servers was planned for and provided in the summer of 1998 on engineering associated with modifications for SDC.

1.13 TRAVEL REQUIREMENTS

None.

1.14 SIMULATION REHOST ACTION ITEMS/RESOLUTION

Not applicable.